



Replacement Sheet

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Title: ADENO-ASSOCIATED VECTOR COMPOSITIONS FOR EXPRESSION OF FACTOR VIII

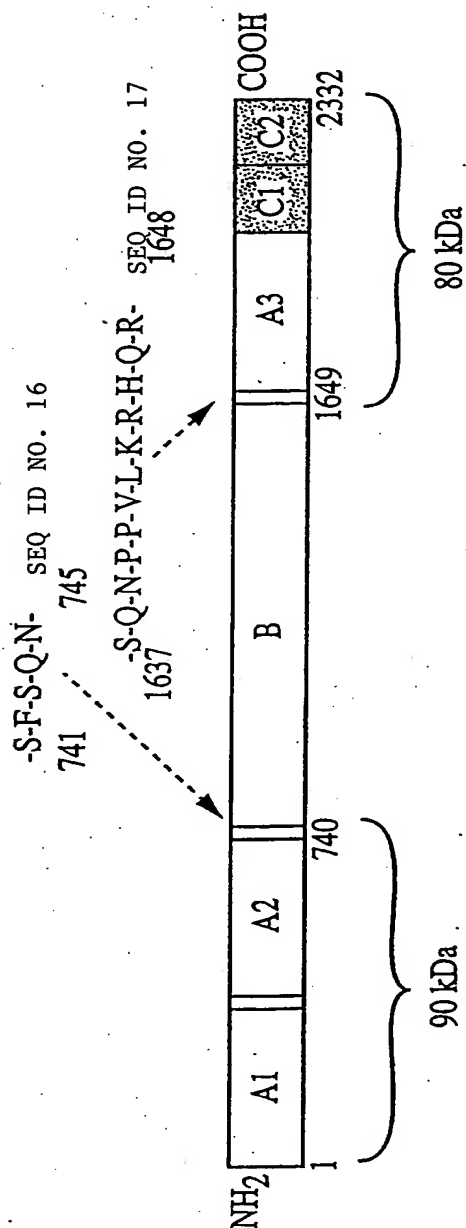


FIG. 1

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Replacement Sheet

-S-F-S-Q-N-P-P-V-L-K-R-H-Q-R- SEQ ID NO. 15



FIG. 2

Replacement Sheet

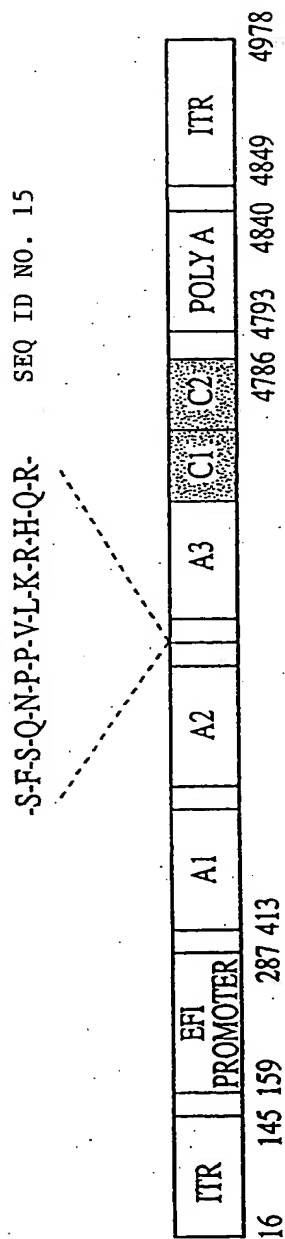


FIG. 4

Replacement Sheet

FIG. 5A
FIG. 5B
FIG. 5C
FIG. 5D

FIG. 5

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CAGCTGCGCGCTCGCTCGCTCACTGAGGCCGCCGGGCAAAGCCCGGGCGTCGGGCGACCTTTGGTCGCCCCGGCCTCAGT
GAGCGAGCGAGCGCGCAGAGAGGGAGTGGCCAACTCCATCACTAGGGGTTCCTGCGGCCGCCAGGGAATGTTTGTCTT
AAATACCATCCAGGGAATGTTTGTCTTAAATACCATCCAGGGAATGTTTGTCTTAAATACCATCTACAGTTATTGGTT
AAAGAAGTATATTAGAGCGAGTCCTTCTGCACACAGATCACCTTTCGGGTGCCGCCCTAGGCAGGTAAGTGCCGTGTG
TGGTTCCCGCGGGCCTGGCCTCTTTACGGGTATGGCCCTTGCGTGCTTGAATTACTGACACTGACATCCACTTTTTCT
TTTTCTCCACAGGTATCGATTCCACCATGCAAATAGAGCTCTCCACCTGCTTCTTTCTGTGCCTTTTGCGATTCTGCTTT
AGTGCCACCAGAAGATACTACCTGGGTGCAGTGGAAGTGTCTATGGGACTATATGCAAAGTGATCTCGGTGAGCTGCCTGT
GGACGCAAGATTTCTCCTAGAGTGCCAAAATCTTTTCCATTCAACACCTCAGTCGTGTACAAAAGACTCTGTTGTAG
AATTCACGGATCACCTTTTCAACATCGCTAAGCCAAGGCCACCCTGGATGGGTCTGCTAGGTCTTACCATCCAGGCTGAG
GTTTATGATACAGTGGTCATTACACTTAAGAACATGGCTTCCCATCCTGTCAGTCTTCATGCTGTTGGTGTATCCTACTG
GAAAGCTTCTGAGGGAGCTGAATATGATGATCAGACCAGTCAAAGGGAGAAAGAAGATGATAAAGTCTTCCCTGGTGAA
GCCATACATATGTCTGGCAGGTCTTGAAAGAGAATGGTCCAATGGCCTCTGACCCACTGTGCCTTACCTACTCATATCTT
TCTCATGTGGACCTGGTAAAAGACTTGAATTCAGGCCTCATTGGAGCCCTACTAGTATGTAGAGAAGGGAGTCTGGCCAA
GAAAAGACACAGACCTTGCACAAATTTATACTACTTTTTGTGTATTTGATGAAGGAAAAGTTGGCACTCAGAAACAA
AGAACTCCTTGATGCAGGATAGGGATGCTGCATCTGCTCGGGCCTGGCCTAAAATGCACACAGTCAATGGTTATGTAAAC
AGGTCTCTGCCAGGTCTGATTGGATGCCACAGGAAATCAGTCTATTGGCATGTGATTGGAATGGGCACCACTCCTGAAGT
GCACTCAATATTCCCTCGAAGGTCACACATTTCTTGAGGAACCATCGCCAGGCGTCTTGGAAATCTCGCCAATAACTT
TCCTTACTGCTCAAACACTCTTGATGGACCTTGGACAGTTTCTACTGTTTTGTATATCTCTTCCCACCAACATGATGGC
ATGGAAGCTTATGTCAAAGTAGACAGCTGTCCAGAGGAACCCCACTACGAATGAAAAATAATGAAGAAGCGGAAGACTA
TGATGATGATCTTACTGATTCTGAAATGGATGTGGTCAGGTTTGATGATGACAACCTCCTTCTTTATCCAAATTCGCT
CAGTTGCCAAGAAGCATCCTAAAACCTTGGGTACATTACATTGCTGCTGAAGAGGAGGACTGGGACTATGCTCCCTTAGTC
CTCGCCCCGATGACAGAAGTTATAAAAGTCAATATTTGAACAATGGCCCTCAGCGGATTGGTAGGAAGTACAAAAAGT
CCGATTTATGGCATAACAGATGAAACCTTTAAGACTCGTGAAGCTATTCAGCATGAATCAGGAATCTTGGGACCTTTAC
TTTATGGGGAAGTTGGAGACACACTGTTGATTATATTTAAGAATCAAGCAAGCAGACCATATAACATCTACCCTCACGGA
ATCACTGATGTCCGTCTTTGTATTCAAGGAGATTACCAAAGGTGTAAACATTTGAAGGATTTTCCAATTCTGCCAGG
AGAAATATTCAAATATAAATGGACAGTGAAGTAGAAGATGGGCCAACTAAATCAGATCCTCGGTGCCTGACCCGCTATT
ACTCTAGTTTCGTTAATATGGAGAGAGATCTAGCTTCAGGACTCATTGGCCCTCTCCTCATCTGCTACAAAGAATCTGTA
GATCAAAGAGGAAACCAGATAATGTCAGACAAGAGGAATGTCATCCTGTTTTCTGTATTTGATGAGAACCGAAGCTGGTA
CCTCACAGAGAATATAACAGCTTTCTCCCAATCCAGCTGGAGTGACGCTTGAGGATCCAGAGTTCCAAGCCTCCAACA
TCATGCACAGCATCAATGGCTATGTTTTTGATAGTTTGCAGTTGTCAGTTTGTGTCATGAGGTGGCATACTGGTACATT
CTAAGCATTGGAGCACAGACTGACTTCCTTTCTGTCTTCTCTCTGGATATACCTTCAAACACAAAATGGTCTATGAAGA

FIG. 5A

CACACTCACCCCTATTCCCATTTCTCAGGAGAACTGTCTTCATGTCGATGGAAAACCCAGGTCTATGGATTCTGGGGTGCC
ACAACTCAGACTTTCGGAACAGAGGCATGACCGCCTTACTGAAGGTTTCTAGTTGTGACAAGAACTGGTGATTATTAC
GAGGACAGTTATGAAGATATTTTCAGCATACTTGCTGAGTAAAAACAATGCCATTGAACCAAGAAGCTTCGAAATAACTCG
TACTACTCTTCAGTCAGATCAAGAGGAAATTGACTATGATGATAACCATATCAGTTGAAATGAAGAAGGAAGATTTTGACA
TTTATGATGAGGATGAAAATCAGAGCCCCCGCAGCTTTCAAAGAAAAACACGACACTATTTTATTGCTGCAGTGAGAGG
CTCTGGGATTATGGGATGAGTAGCTCCCCACATGTTCTAAGAAACAGGGCTCAGAGTGCCAGTGTCCTTCAGTTCAAGAA
AGTTGTTTTCCAGGAATTTACTGATGGCTCCTTTACTCAGCCCTTATACCGTGAGAACTAAATGAACATTTGGGACTCC
TGGGGCCATATATAAGAGCAGAAGTTGAAGATAATATCATGGTAACTTTCAGAAATCAGGCCTCTCGTCCCTATTCCCTTC
TATTCTAGCCTTATTTCTTATGAGGAAGATCAGAGGCAAGGAGCAGAACCTAGAAAAAACTTTGTCAAGCCTAATGAAAC
CAAACTTACTTTTGGAAAGTGCAACATCATATGGCACCCACTAAAGATGAGTTTGACTGCAAAGCCTGGGCTTATTTCT
CTGATGTTGACCTGGAAAAAGATGTGCACTCAGGCCTGATTGGACCCCTTCTGGTCTGCCACACTAACACACTGAACCCCT
GCTCATGGGAGACAAGTGACAGTACAGGAATTTGCTCTGTTTTTACCATCTTTGATGAGACCAAAAGCTGGTACTTCAC
TGAAAAATATGGAAAGAACTGCAGGGCTCCCTGCAATATCCAGATGGAAGATCCCACTTTTAAAGAGAATTATCGCTTCC
ATGCAATCAATGGCTACATAATGGATACACTACCTGGCTTAGTAATGGCTCAGGATCAAAGGATTCGATGGTATCTGCTC
AGCATGGGCAGCAATGAAAACATCCATTCTATTCTATTTCAGTGACATGTGTTCACTGTACGAAAAAAGAGGAGTATAA
AATGGCACTGTACAATCTCTATCCAGGTGTTTTTGAGACAGTGGAATGTTACCATCCAAGCTGGAATTTGGCGGGTGG
AATGCCTTATTGGCGAGCATCTACATGCTGGGATGAGCACACTTTTCTGGTGTACAGCAATAAGTGTGAGACTCCCTTG
GGAATGGCTTCTGGACACATTAGAGATTTTCAGATTACAGCTTCAGGACAATATGGACAGTGGGCCCCAAAGCTGGCCAG
ACTTCATTATTCCGGATCAATCAATGCCTGGAGCACCAAGGAGCCCTTTTCTTGATCAAGGTGGATCTGTTGGCACCA
TGATTATTACGGGCATCAAGACCCAGGGTGCCCGTCAGAAAGTCTCCAGCCTCTACATCTCTCAGTTTATCATCATGTAT
AGTCTTGATGGGAAGAAGTGGCAGACTTATCGAGGAAATCCACTGGAACCTTAATGGTCTTCTTTGGCAATGTGGATTC
ATCTGGGATAAAACACAATATTTTAAACCCTCCAATTATTGCTCGATACATCCGTTTGACCCAACTCATTATAGCATTC
GCAGCACTCTTCGCATGGAGTTGATGGGCTGTGATTTAAATAGTTGCAGCATGCCATTGGGAATGGAGAGTAAAGCAATA
TCAGATGCACAGATTACTGCTTCATCTACTTTACCAATATGTTTGCCACCTGGTCTCCTTCAAAGCTCGACTTCACCT
CCAAGGGAGGAGTAATGCCTGGAGACCTCAGGTGAATAATCCAAAAGAGTGGCTGCAAGTGGACTTCCAGAAGACAATGA
AAGTCACAGGAGTAATACTCAGGGAGTAAATCTCTGCTTACCAGCATGTATGTGAAGGAGTTCCTCATCTCCAGCAGT
CAAGATGGCCATCAGTGGAATCTCTTTTTTTCAGAAATGGCAAAGTAAAGGTTTTTCAGGGAAATCAAGACTCCTTCACACC
TGTGGTGAATCTCTAGACCCACCGTTACTGACTCGCTACCTTCAATTCACCCCCAGAGTTGGGTGCACCAGATTGCCC
TGAGGATGGAGGTTCTGGGCTGCGAGGCACAGGACCTCTACTGACTCGAGAATAAAAGATCAGAGCTCTAGAGATCTGTG
TGTTGGTTTTTTGTGTGCGGCCGAGGAACCCCTAGTGATGGAGTTGGCCACTCCCTCTCTGCGCGCTCGCTCGCTCACT
GAGGCCGGGCGACCAAGGTGCCCCGACGCCCGGGCTTTGCCCGGGCGGCTCAGTGAGCGAGCGAGCGCGCAGCTGCCT
GCAGGACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTTTTTCATAGGCTCC
GCCCCCTGACGAGCATCAAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAGGCG
TTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCTGTTCCGACCTGCCGCTTACCGGATACCTGTCCGCCTTTCTCCCTTC
GGGAAGCGTGGCGCTTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCCAAGCTGGGCTGTG
TGCACGAACCCCCGTTTCAGCCCCACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTCCAACCCGTAAGACACGAC
TTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTG
GTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAAAAGAG
TTGGTAGCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTGTTGCAAGCAGCAGATTACGCGCAGA
AAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGTCTGACGCTCAGTGGAACGAAACTCACGTTAAGGGAT

FIG. 5B

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TTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTAAATCAATCTAAAGTA
TATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTTCGTTCA
TCCATAGTTGCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCCCCAGTGTGCAATGAT
ACCGCGAGACCCACGCTCACC GGCTCCAGATTTATCAGCAATAAACAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTC
CTGCAACTTTATCCGCCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTGCCAGTTAATAGTTTG
CGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTACAGCTCGTCGTTTGGTATGGCTTCATTACAGCTCCGGTTCCCA
ACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAGCGGTTAGCTCCTTCGGTCCCTCCGATCGTTGTGAGAA
GTAAGTTGGCCGAGTGTTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTATGCCATCCGTAAGATGC
TTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACCGAGTTGCTCTTGCCCCGGCGTC
AATACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTTGAAAAACGTTCTTCGGGGCGAAAACTCT
CAAGGATCTTACCCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTC
ACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAATGCCGCAAAAAGGGAATAAGGGCGACACGGAAATGTTGAAT
ACTCATACTCTTCCTTTTCAATATTAATTGAAGCATTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTA
TTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTTCCCCGAAAAGTGCCACCTGACGTCTAAGAAACCATTATTATC
ATGACATTAACCTATAAAAAATAGGCGTATCACGAGGCCCTTTCGTCTCGCGCGTTTCGGTGATGACGGTGAAAACCTCTG
ACACATGCAGCTCCCGGAGACGGTCACAGCTTGTCTGTAAGCGGATGCCGGGAGCAGACAAGCCCGTCAGGGCGCGTCAG
CGGGTGTGGCGGGTGTGCGGGCTGGCTTAATAATGCGGCATCAGAGCAGATTGTACTGAGAGTGCACCATAAAATTGTA
AACGTTAATATTTTGTAAAAATTCGCGTTAAATTTTGTAAATCAGCTCATTTTTTAACCAATAGGCCGAAATCGGCAA
AATCCCTTATAAATCAAAAAGAAATAGCCCGAGATAGGGTTGAGTGTGTTCCAGTTTGGAACAAGAGTCCACTATTAAAGA
ACGTGGACTCCAACGTCAAAGGGCGAAAAACCGTCTATCAGGGCGATGGCCCACTACGTGAACCATCACCCAAATCAAGT
TTTTTGGGGTCGAGGTGCCGTAAAGCACTAAATCGGAACCCCTAAAGGGAGCCCCGATTAGAGCTTGACGGGGAAAGCC
GGCGAACGTGGCGAGAAAGGAAGGAAGAAAGCGAAAGGAGCGGGCGCTAGGGCGCTGGCAAGTGTAGCGGTACGCTGC
GCGTAACCACACACCCGCGCGCTTAATGCGCCGCTACAGGGCGCGTACTATGGTTGCTTTGACGTATGCGGTGTGAAA
TACCGCACAGATGCGTAAGGAGAAAAATACCGCATCAGGCCGTAACTGTGCGGATCACCGGAAAGGACCCGTAAAGTGATA
ATGATTATCATCTACATATCACAACGTGCGTGGAGGCCATCAAACCACGTCAAATAATCAATTATGACGCAGGTATCGTA
TTAATTGATCTGCATCAACTTAACGTAAAAACAACCTTCAGACAATACAAATCAGCGACACTGAATACGGGGCAACCTCAT
GTCAACGAAGAACAGAACCCGAGAACAAACCCGCAACATCCGCTTTCCTAACCAATGATTGAACAAATTAACATCG
CTCTTGAGCAAAAAGGGTCCGGGAATTTCTCAGCCTGGGTCAATTGAAGCCTGCCGTGGGAGACTAACGTCAGAAAAGAGA
GCATATACATCAATTAAGAGTGATGAAGAATGAACATCCCGGTTCTTCCCTCCGAACAGGACGATATTGTAAATTCAT
TAATTACGAGGGCATTGCAGTAATTGAGTTGCAGTTTTACCCTTTCCTGACAGTGACAGACTGCGTGTGGCTCTGTCA
CAGACTAAATAGTTTGAATGATTAGCAGTTATGGTGATCAGTCAACCACCAGGGAATAATCCTTCATATTATTATCGTGC
TTCACCAACGCTGCCTCAATTGCTCTGAATGCTTCCAGAGACACCTTATGTTCTATACATGCAATTACAACATCAGGGTA
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ACGTTGGCCTTACATACATCTGTGCGTTGATTTCCCTCCAGAATGCCAGCAGGACCGCACTTTGTTACGCAACCAATAC
TATTAAGTGAAACATTCTTAATATTTGACATAAATCATCAACAAAACACAAGGAGGTGAGACCAGATTGAAACGATAAA
AACGATAATGCAAACTACGCGCCCTCGTATCACATGGAAGGTTTTACCAATGGCTCAGGTGCCATTTTTAAAGAAATAT
TCGATCAAGTGCGAAAGATTAGACTGTGAATTGTTTTATTCTGAACTAAAACGTCAACACGTCTCACATTATATTAC
TATCTAGCCACAGATAATATTACATCGTGTAGAAAACGATAACACCGTGTAAATAAAAGGACTTAAAAGGTTGTAAA
TGTTAAATTCTCAAGAAACACGCATCTTATAGAAACGTCTATGATAGGTTGAAATCAAGAGAAATCACATTTACGAAT
ACAGGGAAATCTTGCTAAAGCAGGAGTTTTCCGATGGGTACAAATATCCATGAACATAAAAGATATTACTATACCTTT

FIG. 5C

GATAATTCATTACTATTTACTGAGAGCATTTCAGAACACTACACAAATCTTTCCACGCTAAATCATAACGTCGGTTCCTT
CCGTGTCAGCACCGGGGCGTTGGCATAATGCAATACGTGTACGCGCTAAACCCTGTGTGCATCGTTTTAATTATTCCCGG
ACACTCCCGCAGAGAAGTTCCCCGTCAGGGCTGTGGACATAGTTAATCCGGGAATACAATGACGATTTCATCGCACCTGAC
ATACATTAATAAATATTAACAATATGAAATTTCAACTCATTTAGGGTTTGTTTAATTTCTACACATACGATTCTGC
GAACTTCAAAAAGCATCGGGAATAACACCATGAAAAAATGCTACTCGCTACTGCGCTGGCCCTGCTTATTACAGGATGT
GCTCAACAGACGTTTACTGTTCAAAAACAAACCGGCAGCAGTAGCACCAAAGGAAACCATCACCCATCATTTCTTCGTTTC
TGGAATTGGGCAGAAGAAACTGTGCGATGCAGCCAAAATTTGTGGCGGCGCAGAAAATGTTGTTAAACAGAAACCCAGC
AAACATTCGTAAATGGATTGCTCGGTTTTATTACTTTAGGCATTTATACTCCGCTGGAAGCGCGTGTGTATTGCTCACAA
TAATTGCATGAGTTGCCCATCGCGATATGGGCAACTCTATCTGCACTGCTCATTAATATACTTCTGGGTTCTTCCAGTT
GTTTTTGCATAGTGATCAGCCTCTCTCTGAGGGTGAAATAATCCCGTTCAGCGGTGCTGCGCAGTCGGGGGAGGCTGCA
TTATCCACGCGCGAGGCGGTGGTGGCTTCACGCACTGACTGACAGACTGCTTTGATGTGCAACCGACGACGACCAGCGGC
AACATCATCAGCAGAGCATCATTTTCAGCTTTAGCATCAGCTAACTCCTTCGTGTATTTTGCATCGAGCGCAGCAACAT
CACGCTGACGCATCTGCATGTCAGTAATTGCCGCTTCGCCAGCTTCAGTTCTCTGGCATTTTTGTGCGGCTGGGCTTTG
TAGGTAATGGCGTTATCACGGTAATGATTAACAGCCCATGACAGGCAGACGATGATGCAGATAACCAGAGCGGAGATAAT
CGCGGTGACTCTGCTCATACTCAATCTCTCTGACCGTTCCGCGCGCTTCTTTGAATTTTGAATCAGGCTGTCAGCCTT
ATGCTCGAACTGACCATAACCAGCGCCCGGCAGTGAAGCCAGATATTGCTGCAACGGTCGATTGCCTGACGGATATCAC
CAGGATCAATCATAGGTAAAGCGCCACGCTCCTTAATCTGCTGCAATGCCACAGCGTCCTGACTTTTTCGGAGAGAAGTCT
TTCAGGCCAAGCTGCTTGCGGTAGGCATCCCACCAACGGGAAGAAGCTGGTAGCGTCCGGCGCCTGTTGATTTGAGTTT
TGGGTTTAGCGTGACAAGTTTTCGAGGGTGATCGGAGTAATCAGTAAATAGCTCTCCGCCCTACAATGACGTCATAACCAT
GATTTCTGGTTTTCTGACGTCCGTTATCAGTTCCCTCCGACCAGCCAGCATATCGAGGAACGCCTTACGTTGATTATTG
ATTTCTACCATCTTCTACTCCGGCTTTTTTAGCAGCGAAGCGTTTGATAAGCGAACCATCGAGTCAGTACCGATGTAGC
CGATAAACACGCTCGTTATATAAGCGAGATTGCTACTTTAGTCCGGCGAAGTCGAGAAGGTCACGAATGAACCAGGCGATA
ATGGCGCACATCGTTGCGTCGATTACTGTTTTGTAAACGCACCGCCATTATATCTGCCGCGAAGGTACGCCATTGCAAA
CGCAAGGATTGCCCCGATGCCCTTGTTCCCTTGCCGCGAGAATGGCGGCCAACAGGTCATGTTTTCTGGCATCTTCATGT
CTTACCCCCAATAAGGGGATTGCTCTATTTAATTAGGAATAAGGTGCAATTACTGATAGAACAATCCAGGCTACTGTGT
TTAGTAATCAGATTTGTTTCGTGACCGATATGCACGGGCAAAACGGCAGGAGGTTGTTAGCGCGACCTCCTGCCACCCGCT
TTCACGAAGGTCATGTGTAAGGCCGACGCTAATTAATTAATGAATTCAGGACAGACAGTGGCTACGGCTCAGTTT
GGGTTGTGCTGTTGCTGGGCGGCGATGACGCTGTACGCATTTGGTGATCCGGTCTGCTTCCGGTATTTCGCTTAATTCA
GCACAACGGAAAGAGCACTGGCTAACAGGCTCGCCGACTCTTCAGGATTATCGACTCAATGCTCTTACCTGTTGTGCAG
ATATAAAAAATCCCGAAACCGTTATGCAGGCTCTAATTAATTAATGCGAACTGTTTCGGGATTGCATTTTGCAGACCTCT
CTGCCTGCGATGGTTGGAGTTCCAGACGATACGTGCAAGTGACCAACTAGGCGGAATCGGTAGTAAGCGCCGCTCTTTT
CATCTCACTACCACAACGAGCGAATTAACCCATCGTTGAGTCAAATTTACCCAATTTTATTCAATAAGTCAATATCATGC
CGTTAATATGTTGCCATCCGTGGCAATCATGCTGCTAACGTGTGACCGCATTCAAAATGTTGTCTGCGATTGACTCTTCT
TTGTGGCATTGCACCACCAGAGCGTCATACAGCGGCTTAACAGTGCGTGACCGAGTGGGTTGGGTAAGGTTTGGGATTAG
CATCGTCACAGCGGATATGCTGCGCTTGCTGGCATCCTTGAATAGCCGACGCTTTGCATCTTCCGCACTCTTCTCGA
CAACTCTCCCCACAGCTCTGTTTTGGCAATATCAACCGCACGGCTGTACCATGGCAATCTCTGCATCTTGGCCCCGGC
GTCGCGGCACTACGGCAATAATCCGCATAAGCGAATGTTGCGAGCACTTGCAGTACCTTTGCCTTAGTATTTCTTCAAG
CTGCCCCCTGCAGG

FIG. 5D

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FIG. 6A

FIG. 6B

FIG. 6C

FIG. 6 SEQ ID NO. 14

CGCCCCCTGCAGGCAGCTGCGCGCTCGCTCGCTCACTGAGGCCGCCCGGGCAA
AGCCCCGGGCGTCGGGCGACCTTTGGTCGCCCCGGCCTCAGTGAGCGAGCGAGC
GCGCAGAGAGGGAGTGGCCAACTCCATCACTAGGGGTTCCCTGCGGCCGCACG
CGTGGTGGCGCGGGGTAAACTGGGAAAGTGATGTCGTGTACTGGCTCCGCCT
TTTTCCCGAGGGTGGGGGAGAACCGTATATAAGTGACGTAGTCGCCGTGAAC
GTTCTTTTTTCGCAACGGGTTTGCCGCCCCGCGGCAGGTAAGTGCCAGGGAAT
GTTTGTTCCTTAAATACCATCGCTCCAGGGAATGTTTGTTCCTTAAATACCATC
TACTGACACTGACATCCACTTTTTCTTTTTCTCCACAGGTATCGATCCACCA
TGCAAATAGAGCTCTCCACCTGCTTCTTTCTGTGCCTTTTGCGATTCTGCTT
TAGTGCCACCAGAAGATACTACCTGGGTGCAGTGGAAGTGTTCATGGGACTAT
ATGCAAAGTGATCTCGGTGAGCTGCCTGTGGACGCAAGATTTCTCCTAGAG
TGCCAAAATCTTTTCCATTCAACACCTCAGTCGTGTACAAAAGACTCTGTT
TGTAGAATTCACGGATCACCTTTTCAACATCGCTAAGCCAAGGCCACCCTGG
ATGGGTCTGCTAGGTCTTACCATCCAGGCTGAGGTTTATGATACAGTGGTCA
TTACACTTAAGAACATGGCTTCCCATCCTGTCAGTCTTCATGCTGTTGGTGT
ATCCTACTGGAAAGCTTCTGAGGGAGCTGAATATGATGATCAGACCAGTCAA
AGGGAGAAAGAAGATGATAAAGTCTTCCCTGGTGGAAGCCATACATATGTCT
GGCAGGTCCTGAAAGAGAATGGTCCAATGGCCTCTGACCCACTGTGCCTTAC
CTACTCATATCTTTCTCATGTGGACCTGGTAAAAGACTTGAATTCAGGCCTC
ATTGGAGCCCTACTAGTATGTAGAGAAGGGAGTCTGGCCAAGGAAAAGACAC
AGACCTTGACAAATTTATACTACTTTTTTGCTGTATTTGATGAAGGGAAAAG
TTGGCACTCAGAAACAAAGAACTCCTTGATGCAGGATAGGGATGCTGCATCT
GCTCGGGCCTGGCCTAAAATGCACACAGTCAATGGTTATGTAAACAGGTCTC
TGCCAGGTCTGATTGGATGCCACAGGAAATCAGTCTATTGGCATGTGATTGG
AATGGGCACCACTCCTGAAGTGCACCTCAATATTCCTCGAAGGTCACACATTT
CTTGTGAGGAACCATCGCCAGGCGTCCTTGGAATCTCGCCAATAACTTTCC
TTACTGCTCAAACACTCTTGATGGACCTTGGACAGTTTCTACTGTTTTGTCA
TATCTCTTCCCACCAACATGATGGCATGGAAGCTTATGTCAAAGTAGACAGC
TGTCCAGAGGAACCCCAACTACGAATGAAAAATAATGAAGAAGCGGAAGACT
ATGATGATGATCTTACTGATTCTGAAATGGATGTGGTCAGGTTTGATGATGA
CAACTCTCCTTCCTTTATCCAAATTCGCTCAGTTGCCAAGAAGCATCCTAAA

FIG. 6A

ACTTGGGTACATTACATTGCTGCTGAAGAGGAGGACTGGGACTATGCTCCCT
TAGTCCTCGCCCCCGATGACAGAAGTTATAAAAGTCAATATTTGAACAATGG
CCCTCAGCGGATTGGTAGGAAGTACAAAAAGTCCGATTTATGGCATAACACA
GATGAAACCTTTAAGACTCGTGAAGCTATTCAGCATGAATCAGGAATCTTGG
GACCTTTACTTTATGGGGAAGTTGGAGACACACTGTTGATTATATTTAAGAA
TCAAGCAAGCAGACCATATAACATCTACCCCTCACGGAATCACTGATGTCCGT
CCTTTGTATTCAAGGAGATTACCAAAAGGTGTAAACATTTGAAGGATTTTC
CAATTCTGCCAGGAGAAATATTCAAATATAAATGGACAGTGAAGTAGAAGA
TGGGCCAACTAAATCAGATCCTCGGTGCCTGACCCGCTATTACTCTAGTTTC
GTTAATATGGAGAGAGATCTAGCTTCAGGACTCATTGGCCCTCTCCTCATCT
GCTACAAAGAATCTGTAGATCAAAGAGGAAACCAGATAATGTCAGACAAGAG
GAATGTCATCCTGTTTTCTGTATTTGATGAGAACCGAAGCTGGTACCTCACA
GAGAATATACAACGCTTTCTCCCCAATCCAGCTGGAGTGCAGCTTGAGGATC
CAGAGTTCCAAGCCTCCAACATCATGCACAGCATCAATGGCTATGTTTTTGA
TAGTTTGCAGTTGTCAGTTTGTTCATGAGGTGGCATACTGGTACATTCTA
AGCATTGGAGCACAGACTGACTTCCTTTCTGTCTTCTTCTCTGGATATACCT
TCAAACACAAAATGGTCTATGAAGACACACTCACCCCTATTCCCATTTCTCAGG
AGAACTGTCTTCATGTGCGATGGAAAACCCAGGTCTATGGATTCTGGGGTGC
CACAACCTCAGACTTTCGGAACAGAGGCATGACCGCCTTACTGAAGGTTTCTA
GTTGTGACAAGAACACTGGTGATTATTACGAGGACAGTTATGAAGATATTTTC
AGCATACTTGCTGAGTAAAAACAATGCCATTGAACCAAGAAGCTTCTCCCAG
AATCCACCAGTCTTGAAACGCCATCAACGCGAAATAACTCGTACTACTCTTC
AGTCAGATCAAGAGGAAATTGACTATGATGATACCATATCAGTTGAAATGAA
GAAGGAAGATTTTGACATTTATGATGAGGATGAAAATCAGAGCCCCCGCAGC
TTTCAAAGAAAACACGACACTATTTTATTGCTGCAGTGGAGAGGCTCTGGG
ATTATGGGATGAGTAGCTCCCCACATGTTCTAAGAAACAGGGCTCAGAGTGG
CAGTGTCCCTCAGTTCAAGAAAGTTGTTTTCCAGGAATTTACTGATGGCTCC
TTTACTCAGCCCTTATACCGTGGAGAACTAAATGAACATTTGGGACTCCTGG
GGCCATATATAAGAGCAGAAGTTGAAGATAATATCATGGTAACTTTCAGAAA
TCAGGCCTCTCGTCCCTATTCCTTCTATTCTAGCCTTATTTCTTATGAGGAA
GATCAGAGGCAAGGAGCAGAACCTAGAAAAAACTTTGTCAAGCCTAATGAAA
CCAAAACCTACTTTTGGAAAGTGCAACATCATATGGCACCCACTAAAGATGA
GTTTGACTGCAAAGCCTGGGCTTATTTCTCTGATGTTGACCTGGAAAAAGAT
GTGCACTCAGGCCTGATTGGACCCCTTCTGGTCTGCCACACTAACACACTGA
ACCCTGCTCATGGGAGACAAGTGACAGTACAGGAATTTGCTCTGTTTTTTCAC
CATCTTTGATGAGACCAAAGCTGGTACTTCACTGAAAATATGGAAAGAAAC
TGCAGGGCTCCCTGCAATATCCAGATGGAAGATCCCACTTTTAAAGAGAATT
ATCGCTTCCATGCAATCAATGGCTACATAATGGATACACTACCTGGCTTAGT
AATGGCTCAGGATCAAAGGATTCGATGGTATCTGCTCAGCATGGGCAGCAAT

FIG. 6B

GAAAACATCCATTCTATTCAATTTTCAGTGGACATGTGTTCACTGTACGAAAAA
AAGAGGAGTATAAAATGGCACTGTACAATCTCTATCCAGGTGTTTTTGAGAC
AGTGGAAATGTTACCATCCAAAGCTGGAATTTGGCGGGTGGAAATGCCTTATT
GGCGAGCATCTACATGCTGGGATGAGCACACTTTTTCTGGTGTACAGCAATA
AGTGTCACTCCCCTGGGAATGGCTTCTGGACACATTAGAGATTTTCAGAT
TACAGCTTCAGGACAATATGGACAGTGGGCCCCAAAGCTGGCCAGACTTCAT
TATTCGGATCAATCAATGCCTGGAGCACCAGGAGCCCTTTTCTTGATCA
AGGTGGATCTGTTGGCACCAATGATTATTCACGGCATCAAGACCCAGGGTGC
CCGTCAGAAGTTCTCCAGCCTCTACATCTCTCAGTTTATCATCATGTATAGT
CTTGATGGGAAGAAGTGGCAGACTTATCGAGGAAATTCCACTGGAACCTTAA
TGGTCTTCTTTGGCAATGTGGATTCATCTGGGATAAAACACAATATTTTTAA
CCCTCCAATTATTGCTCGATACATCCGTTTGCACCCAATCATTATAGCATT
CGCAGCACTCTTCGCATGGAGTTGATGGGCTGTGATTTAAATAGTTGCAGCA
TGCCATTGGGAATGGAGAGTAAAGCAATATCAGATGCACAGATTACTGCTTC
ATCCTACTTTACCAATATGTTTGCCACCTGGTCTCCTTCAAAGCTCGACTT
CACCTCCAAGGGAGGAGTAATGCCTGGAGACCTCAGGTGAATAATCCAAAAG
AGTGGCTGCAAGTGGACTTCCAGAAGACAATGAAAGTCACAGGAGTAACTAC
TCAGGGAGTAAAATCTCTGCTTACCAGCATGTATGTGAAGGAGTTCCTCATC
TCCAGCAGTCAAGATGGCCATCAGTGGACTCTCTTTTTTTCAGAATGGCAAAG
TAAAGGTTTTTTCAGGGAAATCAAGACTCCTTCACACCTGTGGTGAACCTCTCT
AGACCCACCGTTACTGACTCGCTACCTTCGAATTCACCCCCAGAGTTGGGTG
CACCAGATTGCCCTGAGGATGGAGGTTCTGGGCTGCGAGGCACAGGACCTCT
ACTGACTCGAGCCTAATAAAGGAAATTTATTTTCATTGCAATAGTGTGTTGG
TTTTTTGTGTGCGGCCGCAGGAACCCCTAGTGATGGAGTTGGCCACTCCCTC
TCTGCGCGCTCGCTCGCTCACTGAGGCCGGGCGACCAAAGGTCGCCCCGACGC
CCGGGCTTTGCCCCGGGCGGCCTCAGTGAGCGAGCGAGCGCGCAGCTGCCTGC
AGGACAT

FIG. 6C